

Application Serial Number 10/695272
Response to Final Office Action dated 05/16/2007

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REMARKS

Applicants request reconsideration of the rejections and the pending claims based on the comments below. Claims 17-19 are pending and finally rejected; claims 5, 8, 9, 12, 13, 15, 16 are withdrawn.

The Rejection under 35 U.S.C. 112, first paragraph

Applicants traverse the rejection of claim 19 under 35 U.S.C. 112, first paragraph. The rejection asserts that the claimed limitation that the "signal side driving portion includes a PWM controller arranged ... combination" is not described in the specification. Applicants respectfully point out that on page 8, lines 18-22, a power circuit supplies six kinds of voltages to the scanning side driving circuit and the signal side driving circuit; on page 8, lines 27-32, the specification provides a control circuit that forms display data, a clock and various control signals and supplies them to the scanning side driving circuit and the signal side driving circuit, respectively. Display data are PWM data for signal voltages to be applied to the signal electrodes X1 to X4 in order to control the display gradation of the display. Thus, the specification teaches that the control circuit provides certain signals to the driving circuits. The specification at page 8, line 33 through page 9, line 11 describes how a forward approach signal voltage is generated and how a rearward approach signal voltage is generated. Then, on page 9, lines 27 through page 10, line 20 describes how a shift register 31, a data latch circuit 32, a data selector 33 and a level shifter 34, and a driver 35 interact to generate a rearward approach signal voltage or a forward approach signal voltage, *see* Figures 2 and 3. Various timing charts are shown as Figures 4 -9 which further explain and teach one of ordinary skill in the art the relationship of the forward and the rearward signals applied to the signal electrodes and the scanning electrodes.

Further on page 12, line 30 through page 13, line 12, in conjunction with Figure 5, a rearward/forward approach signal voltage and a forward/rearward approach signal voltage are described and taught in sufficient detail. Applicants thus have shown where and how the originally filed specification and drawings satisfy the requirements of 35 USC 112, first paragraph – namely, that the specification provides a written description

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of the invention in such clear and concise details as to enable one of ordinary skill in the art to make and use the PWM controller to apply rearward approach PWM signals and forward approach PWM signals in the two different approach combinations, as set forth in claim 19. Applicants request the Examiner withdraw the rejection and do not concede the correctness of the rejection.

The Rejection under 35 U.S.C. 102(b) by Yamazaki '326

Claims 17-19 are finally rejected as being anticipated by Yamazaki '326.

Applicants traverse because Yamazaki '326 does not supply rearward approach PWM signals and forward approach PWM signals. Yamazaki '326 is silent about the benefits of pulse-width modulation (PWM) signals. Columns 3 through 6 of Yamazaki '326, the portions of which are referred to in the rejection, set forth modes of zebra, horizontal, vertical and inversion crosstalk. Yamazaki '326 describes how the different types of crosstalk or noise is generated as a result of various signal inputs, for instance, when a signal is input into successive electrodes, a specific spike-shaped voltage is obtained and the displayed color may be lighter or darker than what is desired. When the display experiences horizontal crosstalk resulting from differences in dissipative capacitance when going from high to low than from low to high, the displayed color is lighter. Vertical crosstalk results in a darker display, and inversion crosstalk can result in a lighter display.

Applicants disagree that columns 3-6 teach the invention of claims 17-19. Yamazaki '326 mentions applying signals only to successive electrodes or to specific electrodes, not to odd-numbered and even-numbered electrodes, as claimed. Yamazaki '326, moreover, does not teach or suggest applying a forward approach or a rearward approach and then alternating these approaches on every cycle. Figures 3-20 shown in Yamazaki '326 are illustrations of how crosstalk arises given the input of successive signals or signals to specific electrodes.

Applicants request that claims 17-19 be reconsidered in view of the above remarks and that the rejection of these claims be withdrawn.

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The Rejection under 35 U.S.C. 102(b) under Yamaguchi '084

Claims 17-19 are rejected as being anticipated by Yamaguchi '084. Applicants maintain their traversal of this rejection because, first, Yamaguchi '084 does not teach or suggest using PWM signals. Second, Yamaguchi '084 does not teach or suggest switching between a rearward/forward combination approach and a forward/rearward combination approach in every frame cycle. At column 3, lines 49-68, Yamaguchi '084 describes a method of alternately applying a positive voltage and then applying a negative voltage during a switching cycle wherein the switching cycle may be an entire screen or several scan electrodes. Yamaguchi '084 does not suggest reversing between the rearward/forward combination and a forward/rearward combination for odd or even-numbered scanning electrodes as claimed. Yamaguchi '084 counts the number of electrodes that are ON in a previous cycle and then counts the number of electrodes that are ON in a next cycle and from this difference, determines a compensating voltage to add to obtain a better display. Yamaguchi '084 is completely silent about predetermining which electrodes have which approach and at what time, the claimed subject matter of claims 17-19. Applicants request the reconsideration of the claims in view of the remarks above and withdrawal of the rejection of these claims. Applicants are not conceding the correctness of the rejection.

The Rejection under 35 U.S.C. 103(a)

Claims 17-19 are newly rejected as being obvious over a combination of Yasunishi '335 and Hanami '594. The rejection admits that Yasunishi '335 does not teach switching the application of data signals to a matrix display between a rearward/forward combination approach and a forward/rearward combination approach in every frame. Applicants, however, disagree with the assessment of Hanami '594 that Figures 6B and 7B illustrate the application of a rearward (or forward) PWM signal to odd-numbered and even-numbered electrodes during alternating frames, as required by the claims. In Figure 6B of Hanami '594, at com-1, the applied voltage is high then low for one frame and for the next frame, the applied signal is low then high. At com-2, however, the signal is applied to two rows of electrodes, rather than a single electrode, i.e., com-2 has two electrodes, an odd and an even-numbered electrode, see Figure 6A.

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Com-3 is actually an even-numbered electrode. Hanami '594 does not teach or suggest that the rearward/forward approach alternates with a forward/rearward approach as defined in the claims such that in one frame the odd numbered electrodes have a rearward PWM signal and the even-numbered electrodes have a forward PWM signal and then in the next frame the odd-numbered electrodes have a forward approach and the even-numbered electrodes have a rearward approach. As just one example, Hanami '594 in Figure 6B shows that com-2 has a low signal at the beginning of the frame while at the same time com-3 also has a low signal at the beginning of the frame – there is no alternation of approaches between adjacent electrodes, as required by the claims.

Applicants request the Examiner to reconsider the rejection in view of the above remarks. Applicants do not concede the correctness of the rejection.

Conclusion

Applicants request favorable reconsideration of this application and prompt allowance of the claims because no reference, alone or in combination, teach or suggest the claimed alternating rearward/forward forward/rearward application of signals to odd and even-numbered electrodes as claimed. By doing so, crosstalk and noise is minimized.

If the Examiner thinks that a telephone call would expedite allowance of the claims and issuance of the patent, he is requested to telephone the Attorney for Applications at the number below.



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Respectfully submitted,

HAMRE, SCHUMANN, MUELLER &
LARSON, P.C.
P.O. Box 2902
Minneapolis, MN 55402-0902
(612) 455-3800

By: 

Douglas P. Mueller
Reg. No. 30,300
DPM/KO/ls